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# the Varying Hare

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Varying hare--snowshoe rabbit. Both names describe physical properties of *Lepus americanus*, the big hare of Pennsylvania's north woods. "Varying" refers to its twice-a-year changes in pelt coloration; "hare" identifies it as a member of genus *Lepus*, related to rabbits but differing in several important ways; and "snowshoe" aptly describes the animal's huge, furry hind feet which bear it easily over deep snow.

## Biology

Although closely related to the more abundant cottontail, the snowshoe is not a true rabbit. A hare's digestive tract differs structurally from that of a rabbit, and newborn hares are precocial (fairly well developed) in contrast to the hairless, blind cottontail young.

Snowshoes are about 19 inches in length and weigh 3-5 pounds, males generally 10 percent heavier than females. Body configuration is similar to the cottontail's, although the snowshoe has longer ears, larger feet and a rangier build. In summer, a snowshoe is brown--in winter, white.

In the brown phase, its fur is gray-brown, darker on the rump and down the middle of the back, the throat buffy and the tail dark brown above and white beneath. In autumn, the brown hairs gradually fall out and white hairs replace them. This moult is irregular and may occur in patchwork fashion, but it usually begins on the feet and ears and works upward and toward the rear until the entire pelt is white (except the ear tips, which stay black). A complete change takes about 10 weeks. In spring, another moult occurs; this time, brown hairs replace white, starting with the head and back and ending with the ears and feet by late spring.

Cold temperatures and ground color have nothing to do with the pelt's color change. It results totally from phototropism--in other words, it depends on light. As days get shorter in fall, for instance, a hare's eye receives light for shorter and shorter periods; this stimulates the pituitary gland, located at the base of the brain. During moult, the pituitary shuts off pigment production in the new fur, which therefore grows in white. In spring, lengthening days trigger the reverse of this process.

Snowshoes have excellent hearing and big ears to catch sounds. Eyes are located on the sides of the skull, providing limited depth perception but covering a wide field of view. A hare may stand erect on its hind legs to see or hear better.

Should a predator threaten, a hare can burst out of a relaxed, sitting position into a dead run. It can race up to 30 miles an hour over ground or snow, leap 10 feet in one bound, dodge with agility and swim if forced into water. A hare circles like a cottontail when chased--although making a larger circle--as it's reluctant to leave its home range. A Wisconsin biologist once tracked a hare in snow for over an hour; despite continuous, noisy pursuit, the animal stayed within about 10 acres. Unlike cottontails, hares rarely hole up when running before hounds.

A snowshoe's four toes are large and positioned wide apart. The bottoms of the toes and the soles of the big feet are covered with coarse hair that grows long in winter, making "snowshoes" that support the hare in deep snow and give it traction on icy crusts.

A hare's home range may be 5-30 acres, depending on density of food and cover. Some individuals probably spend months without moving 100 yards from one central location. Hares do not build nests or dens, although they may shelter from hard rain or snow in a hollow log or rock crevice. Primarily nocturnal, they feed at dusk, night or early morning.

During the day, a hare stays in a "form"--a small depression in the leaf litter or ground, either natural or made by the weight of the animal's body resting there. A form is often on a slight rise, providing drainage to keep the bed dry and allowing the occupant to see its surroundings. For protection from predators, a hare locates its form under overhanging branches, in a clump of shrubs or tall weeds, or at the base of a tree or stump. A hare may have several forms within its territory but will use one most of the time. While resting, it sits with head, neck and body drawn together compactly and all four feet gathered beneath it. Ears may be kept erect or laid back on the neck and shoulders.

In summer, snowshoes eat green vegetation including leaves, clover, jewelweed, dandelions and tender buds, and the growing twigs of low woody plants. After frosts kill

herbaceous growth, hares may feed on the dried remains until these are used up or snow-covered. However, snowshoes depend mainly on woody plants for winter food, eating twigs and bark as high as they can reach by standing on their hind legs. Deep snow actually helps hares get food by making a platform that lets them reach higher food sources. They feed on aspens, willows, birch, alders, maples and blackberry canes. They eat bark, twigs and often the needles of conifers--firs, cedars, pines, spruces and hemlock.

Except in breeding season, snowshoes aren't strongly territorial. Many may feed in the same general feeding area. Through habit and convenience, they use a network of trails and runways, which become conspicuous in the snow; on a small scale, this network resembles a deer yard.

Courtship begins in early March, when males (also called bucks) fight furiously for females (does), kicking each other with their powerful hind feet. The females become receptive later in the month. Both sexes are promiscuous.

One to six young (usually 2-3) are born after a 36-day gestation period. The mother does not build a nest and gives birth while sitting in her form or wherever she happens to be. Young are delivered within a half-hour and start to nurse almost immediately. After the initial feeding the mother nurses the young mainly at night and remains a short distance away during the day.

Young hares are called "leverets." They weigh 2½ ounces at birth, their eyes are open and they're capable of walking and hopping soon after they are dry. Their fine brown fur blends with the surroundings. Young start eating green vegetation when a week to 10 days old and usually are weaned and on their own at six or seven weeks of age.

Hares have potential lifespans of eight or nine years, but only an estimated 30 percent live one year and perhaps 15 percent reach age two. Snowshoes fall to hunters, disease, parasites and predators; species which prey on snowshoes include foxes, bobcats, weasels and some hawks and owls.

## Population

As with many Pennsylvania small game species, habitat change has caused varying hare populations to decline in recent years. After the nearly total logging of our state's forests in the late 1800s and early 1900s, brushy growth and saplings provided perfect hare habitat and the population boomed. Today, maturing forests and a large number of deer--which compete for many of the same food sources--combine to restrict the snowshoe population.

Canada and Alaska are present strongholds of the varying hare. Its range extends into northeastern U.S. in mountainous areas as far south as Virginia, and south in the Rockies to central New Mexico. In our state, hares are found in parts of the Allegheny Mountains, high plateaus in the northwest and the Pocono region. As Pennsylvania is the southernmost part of the species' eastern range, the varying hare is not abundant in our state; even if habitat were excellent, it's

unlikely that snowshoes would become as abundant here as they are in New England and Canada.

In the far north, hare populations fluctuate dramatically. At times, snowshoes become super-abundant, with as many as 500-1000 individuals per square mile in primary range. Then the population goes down rapidly for 3-5 years, hits bottom and starts to climb gradually toward another peak. Peaks occur about nine years apart. When hares are abundant for several years, predators increase. Should hares decline over a large area, goshawks and snowy owls range much farther south, while land predators starve or go hungry. Hare population cycles are not fully explained; the actual decline in numbers may result from disease or parasitism from tapeworms, lungworms, ticks, fleas, etc.

Pennsylvania's varying hare population is fairly consistent from year to year. Currently, the Game Commission releases snowshoes on forest cuttings made for this species to try to increase its numbers.

## Habitat

Snowshoes inhabit mixed deciduous forests with conifers and escape cover such as rhododendron and mountain laurel. They favor younger brushy areas, those logged or burned 7-10 years ago. Hares also live in swamps where cedar, spruce or tamarack grow. Dense stands of aspen or poplar, interspersed with pines, may support hares. In Pennsylvania, high country such as ridgetops, mountains, high swamps and plateaus harbor most hares. Game Commission attempts to introduce hares on areas under 1000 feet elevation have been unsuccessful.

As do cottontail rabbits, snowshoes move into forest land opened up by fires, high winds, ice storms and clearcutting. While cottontails build up good populations in clearcut areas in one or two years, snowshoes--with a lower reproductive rate and different food and cover requirements--need up to seven years to take hold. Hares stocked in a fresh clearcut won't stay; apparently, instinctive fear of airborne predators makes them move to more suitable habitat.

Reducing the deer herd through hunting may be the most practical local measure to improve habitat. In winter, deer eat twigs and buds, the same browse items as snowshoes. When deer overpopulate an area--as they've done across much of Pennsylvania's snowshoe hare range--they may severely browse back winter food and cover necessary for snowshoe survival.

In addition to deer management, browse cutting can help snowshoes by bringing edible twigs within reach and encouraging the growth of shrubs, sprouts and seedlings. Planting conifers, particularly spruce, and cutting tall trees to keep them from shading out mountain laurel and shrubs will provide good cover.

This Wildlife Note is available from The Division of Information and Education, Pennsylvania Game Commission, P.O. Box 1567, Harrisburg, Pa. 17120.